IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Art Unit	:	1795
Examiner	:	Ben Lewis
Applicants	:	William James Moore et al.
Appln. No.	:	10/713,833
Filed	:	November 14, 2003
Confirmation No.	:	2557
For	:	ALKALINE ELECTROCHEMICAL CELL

TRANSMITTAL OF APPEAL BRIEF
(PATENT APPLICATION - 37 C.F.R. § 41.37)

1. Transmitted herewith is the APPEAL BRIEF in this application, with respect to the Notice of Appeal filed on March 12, 2008.

2. **STATUS OF APPLICANTS**

This application is on behalf of:

__x__ other than a small entity.

___ a small entity.

3. **FEE FOR FILING APPEAL BRIEF**

Pursuant to 35 U.S.C. § 41(a)(6), the fee for filing the Appeal Brief is:

___ small entity	$255.00
__x__ other than a small entity	$510.00

Appeal Brief fee due: $510.00

4. **EXTENSION OF TERM**

The proceedings herein are for a patent application and the provisions of 35 U.S.C. § 41(a)(8) apply.

(a) ___ Applicant petitions for an extension of time under 37 C.F.R. § 1.136:

Extension (months)	Fee for other than small entity	Fee for small entity
___ one month	$120.00	$60.00
___ two months	$460.00	$230.00
___ three months	$1050.00	$525.00

___ four months	$1640.00	$820.00
___ five months	$2230.00	$1115.00
	FEE:	$

If an additional extension of time is required, please consider this a petition therefor.

_x_ Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that Applicant has inadvertently overlooked the need for a petition and fee for extension of time.

5. TOTAL FEE DUE

The total fee due is:

Appeal Brief fee:	$ 510.00
Extension fee (if any)	$_____
TOTAL FEE DUE:	$ 510.00

6. FEE PAYMENT

___ Attached is a check in the sum of $_____.

_x_ Charge Account No. 16 2463 the sum of $510.00.

7. FEE DEFICIENCY

_x_ If any additional extension and/or fee is required, this is a request therefor and to charge Account No. 16 2463.

and/or

_x_ If any additional fee for claims is required, charge Account No. 16 2463.

Respectfully submitted,

May 12, 2008
Date

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APPEAL BRIEF (37 C.F.R. § 41.37)

This brief is in furtherance of the Notice of Appeal, filed in this case on March 12, 2008.

The fees required under 35 U.S.C. § 41(a)(6), and any required petition for extension of time for filing this brief and fees therefor, are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This brief contains these items under the following headings, and in the order set forth below (37 C.F.R. § 41.37(c)):

I. Real Party in Interest

II. Related Appeals and Interferences

III. Status of Claims

IV. Status of Amendments

V. Summary of Claimed Subject Matter

- A. Independent Claim 1
- B. Dependent Claim 4
- C. Independent Claim 24
- D. Independent Claim 30
- E. Independent Claim 35
- F. Independent Claim 40
- G. Dependent Claim 48
- H. Dependent Claim 49

I. Dependent Claim 50

J. Dependent Claim 51

VI. Grounds of Rejection to Be Reviewed on Appeal

A. Whether claims 1-4, 9-13, 16, 24-25, 30-31, 35-36, 40-44, 47-51 are patentable under 35 U.S.C. § 103(a) as obvious over U.S. Patent Application Publication No. 2004/0115532 to Malservisi et al. in view of U.S. Patent No. 5,209,995 to Tada et al.

B. Whether claims 5-8, 14-15, 26-29, 32-34, 37-39 and 45-46 are patentable under 35 U.S.C. as obvious over U.S. Patent Application Publication No. 2004/0115532 to Malservisi et al. in view of U.S. Patent No. 6,436,539 to Goldstein et al. and further in view of U.S. Patent Application Publication No. 2004/0033418 to Armacanqui et al.

VII. Argument

A. Rejection of claims under 35 U.S.C. §103(a) as obvious over U.S. Patent Application Publication No. 2004/0115532 to Malservisi et al. in view of U.S. Patent No. 5,209,995 to Tada et al. (1-4, 9-13, 16, 24-25, 30-31, 35-36, 40-44) and further in view of U.S. Patent Application Publication No. 2004/0033418 to Armacanqui et al. (5-8, 14-15, 26-29, 32-34, 37-39 and 45-46)

1. Claims 1-3, 5-16, and 24-47

2. Claims 4 and 48-51

B. Conclusion

VIII. Claims Appendix

IX. Evidence Appendix

X. Related Proceedings Appendix

The final page of this brief bears the attorney's electronic signature.

I. Real Party in Interest

The real party in interest in this application is Eveready Battery Company, Inc., the assignment to which was recorded at Reel 014711, Frame 0332, on November 14, 2003.

II. Related Appeals and Interferences

Appellants are aware of no appeals, interferences or judicial proceedings which may be related to, directly affect or be directly affected by, or have a bearing on the Board's decision in the pending appeal.

III. Status of Claims

This is an appeal from the Final Office Action rejecting all pending claims 1-16 and 24-51, mailed on December 13, 2007. No claims currently stand allowed. The rejection of claims 1-16 and 24-51 is appealed.

IV. Status of Amendments

There have not been any amendments to the claims filed subsequent to the Final Office Action mailed on December 13, 2007.

V. Summary of Claimed Subject Matter

A. Independent Claim 1 defines an electrochemical cell, comprising: a) a container (10) housing a first electrode (50), said electrode defining a cavity therein; b) a separator (20) lining said cavity and abutting said first electrode (50); c) a second electrode (60) disposed within said separator lined cavity, said second electrode (60) having a known volume and less than 50 parts per million ("ppm") of mercury, said second electrode (60) comprises zinc powder having a tap density greater than 2.80 g/cc and less than 3.65 g/cc, said zinc powder occupies less than 28.0 volume percent of said second electrode's (60) volume (Fig. 1; page 3, line 24 – page 4, line 3) and said zinc powder has a BET specific surface area greater than 400 cm^2/g (page 11, lines 2-3); and d) a quantity of alkaline electrolyte disposed within said container (10) and in contact with said electrodes (50, 60) and said separator (20) (Fig. 1; page 4, lines 3-4).

B. Dependent Claim 4 defines an electrochemical cell, comprising: a) a container (10) housing a first electrode (50), said electrode (50) defining a cavity therein; b) a separator

(20) lining said cavity and abutting said first electrode (50); c) a second electrode (60) disposed within said separator lined cavity, said second electrode (60) having a known volume and less than 50 ppm of mercury, said second electrode (60) comprises zinc powder having a tap density greater than 2.80 g/cc and less than 3.65 g/cc (Fig. 1; page 3, line 24 – page 4, line 3) and said zinc powder has a BET specific surface area greater than 400 cm^2/g (page 11, lines 2-3); and d) a quantity of alkaline electrolyte disposed within said container (10) and in contact with said electrodes (50, 60) and said separator (20) (Fig. 1; page 4, lines 3-4), and wherein the volume of zinc is no greater than 24.0% of the second electrode's (60) volume (Fig. 1; page 9, lines 1-2 and page 19, lines 19-21).

C. Independent Claim 24 defines an LR6 size electrochemical cell (page 4, lines 14-15), comprising: a) a cylindrical (page 1, line 7 and page 22, line 14) container (10) housing a first electrode (50) defining a centrally located cavity therein (Fig. 1; page 4, lines 16-17 and page 12, line 29); b) a second electrode (60) having less than 50 ppm of mercury and disposed within said cavity, said second electrode (60) comprising no more than 4.3 grams of zinc powder (Fig. 1; page 4, lines 17-19) having a tap density between 2.80 g/cc and 3.65 g/cc (page 4, lines 7-8) and a BET specific surface area greater than 400 cm^2/g (page 11, lines 2-3); c) a separator (20) located between said electrodes (50, 60); and d) a quantity of alkaline electrolyte in contact with said electrodes (50, 60) and separator (20); wherein said cell, if discharged at 250 milliamps constant current for one hour per day, would have a minimum closed circuit voltage of 0.90 volts for at least 538 total accumulated minutes (Fig. 1; page 4, lines 19-23).

D. Independent Claim 30 defines an LR6 electrochemical cell (page 4, lines 14-15), comprising: a) a cylindrical container (10) (Fig. 1; page 1, line 7 and page 22, line 14) housing a first electrode (50) defining a centrally located cavity therein (Fig. 1; page 4, lines 16-17 and page 12, line 29); b) a second electrode (60) disposed within said cavity, said second electrode (60) comprising no more than 4.3 grams of zinc powder (Fig. 1; page 4, lines 17-19) having a tap density between 2.80 g/cc and 3.65 g/cc (page 4, lines 7-8), a BET specific surface area greater than 400 cm^2/g (page 11, lines 2-3) and less than 50 ppm of mercury; c) a separator

(20) located between said electrodes (50, 60); and d) a quantity of electrolyte in contact with said electrodes (50, 60) and separator (20) (Fig. 1; page 4, lines 15-21); wherein said cell, if discharged across a 43 ohm resistor for four hours per day, would have a minimum closed circuit voltage of 0.9 volts for at least 100 total accumulated hours (page 4, lines 23-26 and page 24, lines 3-5).

E. Independent Claim 35 defines an LR6 electrochemical cell (page 4, lines 14-15), comprising: a) a cylindrical container (10) (Fig. 1; page 1, line 7 and page 22, line 14) housing a first electrode (50) defining a centrally located cavity therein (Fig. 1; page 4, lines 16-17 and page 12, line 29); b) a second electrode (60) disposed within said cavity and having less than 50 ppm of added mercury, said second electrode (60) comprising no more than 4.3 grams of zinc powder (Fig. 1; page 4, lines 17-18) having a tap density between 2.80 g/cc and 3.65 g/cc (page 4, lines 7-8) and a specific surface area greater than 400 cm^2/g (page 11, lines 2-3); c) a separator (20) located between said electrodes (50, 60); and d) a quantity of electrolyte in contact with said electrodes (50, 60) and separator (20) (Fig. 1; page 4, lines 15-21); wherein said cell, if continuously discharged at a rate of one watt, would have a minimum closed circuit voltage of 1.0 volts for at least 58 minutes (page 4, lines 26-28).

F. Independent Claim 40 defines an electrochemical cell, comprising: a) a container (10) housing a first electrode (50), said electrode (50) defining a cavity therein; b) a separator (20) lining said cavity and abutting said first electrode (50); c) a second electrode (60) comprising zinc powder and disposed within said separator lined cavity, said zinc powder having a tap density greater than 2.80 g/cc and less than 3.65 g/cc, a BET surface area greater than 400 cm^2/g, a KOH absorption value of at least 14%, and a D_{50} less than 130 microns (Fig. 1; page 4, line 29 – page 5, line 5); and d) a quantity of alkaline electrolyte disposed within said container (10) and in contact with said electrodes (50, 60) and said separator (20) (Fig. 1; page 4, lines 3-4).

G. Dependent Claim 48 defines an LR6 size electrochemical cell (page 4, lines 14-15), comprising: a) a cylindrical container (10) (Fig. 1; page 1, line 7 and page 22, line 14) housing a first electrode (50) defining a centrally located cavity therein (Fig. 1; page 4, lines

16-17 and page 12, line 29); b) a second electrode (60) having less than 50 ppm of mercury and disposed within said cavity, said second electrode (60) comprising no more than 4.3 grams of zinc powder (Fig. 1; page 4, lines 17-19) having a tap density between 2.80 g/cc and 3.65 g/cc (page 7, lines 7-8) and a BET specific surface area greater than 400 cm^2/g (page 11, lines 2-3); c) a separator (20) located between said electrodes (50, 60); and d) a quantity of alkaline electrolyte in contact with said electrodes (50, 60) and separator (20); wherein said cell, if discharged at 250 milliamps constant current for one hour per day, would have a minimum closed circuit voltage of 0.90 volts for at least 538 total accumulated minutes (Fig. 1; page 4, lines 19-23), and wherein the volume of zinc occupies less than 24.0% of the second electrode's (60) volume (Fig. 1; page 9, lines 1-2 and page 19, lines 19-21).

H. Dependent Claim 49 defines an LR6 electrochemical cell (page 4, lines 14-15), comprising: a) a cylindrical container (10) (Fig. 1; page 1, line 7 and page 22, line 14) housing a first electrode (50) defining a centrally located cavity therein (Fig. 1; page 4, lines 16-17 and page 12, line 29); b) a second electrode (60) disposed within said cavity, said second electrode (60) comprising no more than 4.3 grams of zinc powder (Fig. 1; page 4, lines 17-19) having a tap density between 2.80 g/cc and 3.65 g/cc (page 7, lines 7-8), a BET specific surface area greater than 400 cm^2/g (page 11, lines 2-3) and less than 50 ppm of mercury; c) a separator (20) located between said electrodes (50, 60); and d) a quantity of electrolyte in contact with said electrodes (50, 60) and separator (20) (Fig. 1; page 4, lines 15-21); wherein said cell, if discharged across a 43 ohm resistor for four hours per day, would have a minimum closed circuit voltage of 0.9 volts for at least 100 total accumulated hours (page 4, lines 23-26 and page 24, lines 3-5), and wherein the volume of zinc occupies less than 24.0% of the second electrode's (60) volume (Fig. 1; page 9, lines 1-2 and page 19, lines 19-21).

I. Dependent Claim 50 defines an LR6 electrochemical cell (page 4, lines 14-15), comprising: a) a cylindrical container (10) (Fig. 1; page 1, line 7 and page 22, line 14) housing a first electrode (50) defining a centrally located cavity therein (Fig. 1; page 4, lines 16-17 and page 12, line 29); b) a second electrode (60) disposed within said cavity and having less than 50 ppm of added mercury, said second electrode (60) comprising no more than 4.3 grams of

zinc powder (Fig. 1; page 4, lines 17-18) having a tap density between 2.80 g/cc and 3.65 g/cc (page 4, lines 7-8) and a specific surface area greater than 400 cm^2/g (page 11, lines 2-3); c) a separator (20) located between said electrodes (50, 60); and d) a quantity of electrolyte in contact with said electrodes (50, 60) and separator (20) (Fig. 1; page 4, lines 15-21); wherein said cell, if continuously discharged at a rate of one watt, would have a minimum closed circuit voltage of 1.0 volts for at least 58 minutes (page 4, lines 26-28), and wherein the volume of zinc occupies less than 24.0% of the second electrode's (60) volume (Fig. 1; page 9, lines 1-2 and page 19, lines 19-21).

J. Dependent Claim 51 defines an electrochemical cell, comprising: a) a container (10) housing a first electrode (50), said electrode (50) defining a cavity therein; b) a separator (20) lining said cavity and abutting said first electrode (50); c) a second electrode (60) comprising zinc powder and disposed within said separator lined cavity, said zinc powder having a tap density greater than 2.80 g/cc and less than 3.65 g/cc, a BET surface area greater than 400 cm^2/g, a KOH absorption value of at least 14%, and a D_{50} less than 130 microns (Fig. 1; page 4, line 29 – page 5, line 5); and d) a quantity of alkaline electrolyte disposed within said container (10) and in contact with said electrodes (50, 60) and said separator (20) (Fig. 1; page 4, lines 3-4), and wherein the volume of zinc occupies less than 24.0% of the second electrode's (60) volume (Fig. 1; page 9, lines 1-2 and page 19, lines 19-21).

VI. Grounds of Rejection to Be Reviewed on Appeal

A. Whether claims 1-4, 9-13, 16, 24-25, 30-31, 35-36, 40-44 and 47-51 are patentable under 35 U.S.C. § 103(a) as obvious over U.S. Patent Application Publication No. 2004/0115532 to Malservisi et al. in view of U.S. Patent No. 5,209,995 to Tada et al.

B. Whether claims 5-8, 14-15, 26-29, 32-34, 37-39 and 45-46 are patentable under 35 U.S.C. as obvious over U.S. Patent Application Publication No. 2004/0115532 to Malservisi et al. in view of U.S. Patent No. 6,436,539 to Goldstein et al. and further in view of U.S. Patent Application Publication No. 2004/0033418 to Armacanqui et al.

VII. Argument

A. Rejection of claims under 35 U.S.C. § 103(a) as obvious over U.S. Patent Application Publication No. 2004/0115532 to Malservisi et al. in view of U.S. Patent No. 5,209,995 to Tada et al. (claims 1-4, 9-13, 16, 24-25, 30-31, 35-36, 40-44) and further in view of U.S. Patent Application Publication No. 2004/0033418 to Armacanqui et al. (claims 5-8, 14-15, 26-29, 32-34, 37-39 and 45-46)

1. Claims 1-3, 5-16, and 24-47

In the Final Office Action mailed December 13, 2007, claims 1-3, 9-13, 16, 24-25, 30-31, 35-36, 40-44, and 47 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Malservisi (U.S. Patent Application Publication No. 2004/0115532) in view of Tada (U.S. Patent No. 5,209,995). Claims 5-8, 14-15, 26-29, 32-34, 37-39, and 45-46 were also rejected under 35 U.S.C. § 103(a) as being unpatentable over Malservisi in view of Tada in further in view of Armacanqui (U.S. Publication No. 2004/0033418).[1]

The *Manual of Patent Examining Procedures* ("M.P.E.P.") states that an Examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. M.P.E.P. § 2142. The combination of prior art references must have been "obvious to a person with ordinary skill in the art." *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1742 (2007). To establish a case of *prima facie* obviousness, there must be some apparent reason why a person of ordinary skill in the art would combine the references, and the analysis should be made explicit. *Id.* at 1741; M.P.E.P. § 2142. Further, to establish obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981 (C.C.P.A. 1974). If the prior art does not teach or suggest all of the claimed

[1] Appellants note that the Examiner initially, and correctly, stated that the patent number for Tada is U.S. Patent No. 5,209,995. However, the Examiner later referenced Tada in relation to the rejection of claims 5-8, 14-15, 26-29, 32-34, 37-39, and 45-46, but incorrectly cited it as U.S. Patent No. 6,436,539. The listed inventors on U.S. Patent No. 6,436,539 are Goldstein et al. For purposes of discussion, Appellants assume that the rejection of claims 5-8, 14-15, 26-29, 32-34, 37-39, and 45-46 was based on the Tada reference, rather than the Goldstein et al. reference, since the Examiner referenced the prior discussion with relation to Tada in its later rejection on page 12 of the Office Action. Moreover, the Examiner did not enumerate a reason for its obviousness rejection based on the Goldstein et al. reference. Accordingly, whenever Tada is discussed in Appellants' brief, it is in relation to U.S. Patent No. 5,209,995.

limitations, the Examiner must explain why the differences between the prior art and the claimed invention would have been obvious to one having ordinary skill in the art. M.P.E.P. § 2143.

All of the pending claims require the zinc powder to have a specific surface area greater than 400 cm^2/g. The Examiner cited the combination of Malservisi and Tada to reject the independent claims based on obviousness. The Examiner reasoned that one having ordinary skill in the art would have changed the specific surface area of the zinc particles of Malservisi as taught by Tada to provide sufficient reactivity. (Final Office Action, p. 4). Specifically, the Examiner stated:

> Tada et al. disclose zinc alkaline cells (title) wherein Is [sic] the bulk specific gravity of the zinc alloy powder would be less than 2.90 (grams per cm.sup.3), on the one hand, the action of suppressing gasses from generating maY [sic] be reduced because the shapes of the zinc alloy powder particles may become so nearly acicular that the specific surface area of the zinc alloy powder particles becomes large enough to make their reactivity too high. If the bulk specific gravity thereof would be larger than 3.50 (grams per cm.sup.3), on the other hand, the discharge performance may be lowered because the shapes of the zinc alloy powder particles become so nearly spherical that their surface area becomes smaller, thereby making their reactivity too low (Col 2 lines 40-54).

(Final Office Action, p. 4).

Appellants respectfully submit that the Tada reference does not disclose a zinc powder with a specific surface area greater than 400 cm^2/g. The portion of the Tada reference cited by the Examiner does not contain an express disclosure of a numeric range of specific surface area. The cited portion only expressly teaches a numeric range of bulk specific gravity, namely a range between 2.90 g/cm^3 and 3.50 g/cm^3. However, bulk specific gravity is a completely different measurement than specific surface area, as evidenced by their units of measurement. Bulk specific gravity is expressed as g/cm^3, whereas specific surface area is expressed in cm^2/g. These measurements do not necessarily directly correlate. Accordingly, the Examiner has not adequately articulated a reason as to why one having ordinary skill in the art would have modified the bulk specific gravity disclosure of the Tada reference to arrive at

the claimed limitation of specific surface area. For this reason, Appellants assert that the Examiner has not articulated a *prima facie* case of obviousness.

Appellants further submit that, even assuming that the Examiner has somehow articulated a *prima facie* case of obviousness, which Appellants submit that the Examiner has failed to do, one of ordinary skill would not have combined the Malservisi reference with the Tada reference, since the Tada reference instead teaches away from the claimed limitation. The Examiner reasoned that it would have been obvious to use zinc powder with a specific surface area greater than 400 cm^2/g based on the disclosure in the Tada reference. However, the Tada reference teaches that reactivity can become too low if the surface area of the particles become too small, and that reactivity can become too high if the surface area of the particles becomes too large. (Tada, col. 2, lines 40-52). The Tada reference therefore implies that there is an upper limit and a lower limit to the surface area of particles which should be utilized in the cell to achieve a higher reactivity.

In contrast, all of the pending claims include a limitation that the specific surface area of the zinc powder is at least greater than 400 cm^2/g. This claimed limitation is distinguishable from the lack of any such teaching in the Tada reference. Moreover, one having ordinary skill would have been discouraged from using a zinc powder with a specific surface area at least greater than 400 cm^2/g in order to avoid the reactivity from becoming too high. See *In re Hyung W. Kim*, Appeal No. 2001-1002, 2004 WL 77128, *3-4 (Bd. Pat. App. & Interf. 2004). Accordingly, Appellants submit that the combination of Malservisi in view of Tada would not have rendered the pending claims obvious for at least the foregoing reasons.

2. Claims 4 and 48-51

Of this group of claims, claim 4 depends from claim 1, 48 depends from claim 24, claim 49 depends from claim 30, claim 50 depends from claim 35, and claim 51 depends from claim 40. Claims 4 and 48-51 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Malservisi in view of Tada. Since claims 4 and 48-51 depend from independent claims 1, 24, 30, 35 and 40, respectively, Appellants assert that claims 4 and 48-51 are allowable for the same reasons set forth above with respect to the rejection of claims 1, 24, 30, 35 and 40.

Appellants respectfully assert that claims 4 and 48-51 are allowable for the additional reason that one of ordinary skill in the art would not have combined Malservisi with Tada to arrive at the claimed invention. Claims 4 and 48-51 contain the limitation that "the volume of zinc is no greater than 24.0% of the second electrode's volume." In the Final Office Action, the Examiner represented that the Malservisi reference teaches a zinc powder occupying 23.2 volume percent of the second electrode's volume. (Final Office Action, p. 3). However, Appellants independently calculated the amount of zinc powder disclosed in Malservisi to be 24.7 volume percent. Appellants respectfully assert that the Examiner appears to have miscalculated the volume percent of zinc powder for multiple reasons.

First, it appears that the Examiner's calculation does not take into account the correct density for KOH. The density which is used in the Examiner's calculations is the density of KOH in solution. If the Examiner wanted to separately calculate KOH, then the Examiner should have used the density of KOH as a solid, which is about 2.04 g/cc.[2]

Second, even if the Examiner had used the density of solid KOH, which the Appellants also assert is incorrect, then the calculation still would have been incorrect. In combining a solid into a liquid solution, the volumes of the two components are not necessarily additive, since the solid may dissolve into the solution. In this case, where KOH is added to a solution, the KOH will dissolve into the solution. In the Examiner's calculation, the Examiner combined the volume of KOH as if none of it had dissolved into the solution.

Since the Examiner has not cited any references which teach an electrochemical cell comprising zinc powder occupying less than 24.0 volume percent of the second electrode's volume, Appellants further submit that the Examiner has not established a *prima facie* case of obvious for at least claims 4 and 48-51. Thus, for at least this additional reason, Appellants assert that claims 4 and 48-51 are allowable over the cited references.

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[2] Appellants respectfully assert that the density of KOH as a solid is a well-known inherent property.

B. Conclusion

For at least the foregoing reasons, and as is apparent from examining the invention defined by claims 1-16 and 24-51, claims 1-16 and 24-51 would not have been obvious when properly considering the cited references. Appellants respectfully request that the Examiner's rejection of claims 1-16 and 24-51 under 35 U.S.C. § 103(a) be reversed, and that the application be passed to issuance forthwith.

Respectfully submitted,

May 12, 2008
Date

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VIII. Appendix of Claims (35 U.S.C. § 41.37(c))

1. An electrochemical cell, comprising:
   a) a container housing a first electrode, said electrode defining a cavity therein;
   b) a separator lining said cavity and abutting said first electrode;
   c) a second electrode disposed within said separator lined cavity, said second electrode having a known volume and less than 50 ppm of mercury, said second electrode comprises zinc powder having a tap density greater than 2.80 g/cc and less than 3.65 g/cc, said zinc powder occupies less than 28.0 volume percent of said second electrode's volume and said zinc powder has a BET specific surface area greater than 400 cm^2/g; and
   d) a quantity of alkaline electrolyte disposed within said container and in contact with said electrodes and said separator.

2. The electrochemical cell of claim 1, wherein the volume of zinc is no greater than 27.0% of the second electrode's volume.

3. The electrochemical cell of claim 1, wherein the volume of zinc is no greater than 26.0% of the second electrode's volume.

4. The electrochemical cell of claim 1, wherein the volume of zinc is no greater than 24.0% of the second electrode's volume.

5. The electrochemical cell of claim 1, wherein the second electrode comprises a gelling agent, said gelling agent comprises an absorbed quantity of an aqueous alkaline solution, said solution comprises no more than 36% by weight potassium hydroxide.

6. The electrochemical cell of claim 5, wherein said solution comprises no more than 34% by weight potassium hydroxide.

7. The electrochemical cell of claim 5, wherein said solution comprises no more than 32% by weight potassium hydroxide.

8. The electrochemical cell of claim 5 wherein said second electrode has a resistivity value less than 4 $m\Omega \cdot cm$.

9. The electrochemical cell of claim 1 wherein said particulate zinc has a KOH absorption value of at least 14% and a D_{50} less than 130 microns.

10. The electrochemical cell of claim 1 wherein said tap density is greater than 2.90 g/cc and less than 3.55 g/cc.

11. The electrochemical cell of claim 1 wherein said tap density is greater than 3.00 g/cc and less than 3.45 g/cc.

12. The electrochemical cell of claim 9, wherein said BET specific surface area is greater than 450 cm^2/g.

13. The electrochemical cell of claim 9, wherein said KOH absorption value is at least 15%.

14. The electrochemical cell of claim 9 wherein said D_{50} is between 100 and 130 microns.

15. The electrochemical cell of claim 14, wherein said D_{50} is between 110 and 120 microns.

16. The electrochemical cell of claim 1 wherein said particulate zinc is a zinc alloy comprising bismuth between 75 ppm and 125 ppm, indium between 175 ppm and 225 ppm, and aluminum between 75 ppm and 125 ppm.

24. An LR6 size electrochemical cell, comprising:

a) a cylindrical container housing a first electrode defining a centrally located cavity therein;

b) a second electrode having less than 50 ppm of mercury and disposed within said cavity, said second electrode comprising no more than 4.3 grams of zinc powder having a tap density between 2.80 g/cc and 3.65 g/cc and a BET specific surface area greater than 400 cm^2/g;

c) a separator located between said electrodes; and

d) a quantity of alkaline electrolyte in contact with said electrodes and separator;

wherein said cell, if discharged at 250 milliamps constant current for one hour per day, would have a minimum closed circuit voltage of 0.90 volts for at least 538 total accumulated minutes.

25. The electrochemical cell of claim 24, wherein said cell, if discharged across a 43 ohm resistor for four hours per day, would have a minimum closed circuit voltage of 0.9 volts for at least 100 total accumulated hours.

26. The electrochemical cell of claim 24 wherein said second electrode comprises a gelling agent, said gelling agent comprises an absorbed quantity of an aqueous solution, said solution comprises no more than 36% by weight KOH.

27. The electrochemical cell of claim 26, wherein said second electrode comprises, in addition to said zinc powder, an aqueous solution having no more than 33 weight percent potassium hydroxide, said weight percent of potassium hydroxide based on the total quantities of water and potassium hydroxide in said second electrode just prior to disposing the second electrode into said container.

28. The electrochemical cell of claim 27, wherein said potassium hydroxide in said second electrode's aqueous solution is less than 32 weight percent.

29. The electrochemical cell of claim 28, wherein said potassium hydroxide in said second electrode's aqueous solution is no more than 31 weight percent.

30. An LR6 electrochemical cell, comprising:

a. a cylindrical container housing a first electrode defining a centrally located cavity therein;

b. a second electrode disposed within said cavity, said second electrode comprising no more than 4.3 grams of zinc powder having a tap density between 2.80 g/cc and 3.65 g/cc, a BET specific surface area greater than 400 cm^2/g and less than 50 ppm of mercury;

c. a separator located between said electrodes; and

d. a quantity of electrolyte in contact with said electrodes and separator;

wherein said cell, if discharged across a 43 ohm resistor for four hours per day, would have a minimum closed circuit voltage of 0.9 volts for at least 100 total accumulated hours.

31. The electrochemical cell of claim 30, wherein said cell, if continuously discharged at a rate of one watt, would have a minimum closed circuit voltage of 1.0 volts for at least 58 minutes.

32. The electrochemical cell of claim 30, wherein said second electrode comprises, in addition to said zinc powder, an aqueous solution having no more than 33 weight percent potassium hydroxide, said weight percentage of potassium hydroxide based on the total quantities of water and potassium hydroxide in said second electrode just prior to disposing the second electrode into said container.

33. The electrochemical cell of claim 32, wherein said potassium hydroxide in said second electrode's aqueous solution is less than 32 weight percent.

34. The electrochemical cell of claim 33, wherein said potassium hydroxide in said second electrode's aqueous solution is no more than 31 weight percent.

35. An LR6 electrochemical cell, comprising:

a) a cylindrical container housing a first electrode defining a centrally located cavity therein;

b) a second electrode disposed within said cavity and having less than 50 ppm of added mercury, said second electrode comprising no more than 4.3 grams of zinc powder having a tap density between 2.80 g/cc and 3.65 g/cc and a specific surface area greater than 400 cm^2/g;

c) a separator located between said electrodes; and

d) a quantity of electrolyte in contact with said electrodes and separator;

wherein said cell, if continuously discharged at a rate of one watt, would have a minimum closed circuit voltage of 1.0 volts for at least 58 minutes.

36. The electrochemical cell of claim 35, wherein said cell, if discharged at 250 milliamps constant current for one hour per day, would have a minimum closed circuit voltage of 0.90 volts for at least 538 total accumulated minutes.

37. The electrochemical cell of claim 35, wherein said second electrode comprises, in addition to said particulate zinc, an aqueous solution having no more than 33 weight percent potassium hydroxide, said weight percentage of potassium hydroxide based on the total quantities of water and potassium hydroxide in said second electrode just prior to disposing the second electrode into said container.

38. The electrochemical cell of claim 37, wherein said potassium hydroxide in said second electrode's aqueous solution is less than 32 weight percent.

39. The electrochemical cell of claim 38, wherein said potassium hydroxide in said second electrode's aqueous solution is no more than 31 weight percent.

40. An electrochemical cell, comprising:

a) a container housing a first electrode, said electrode defining a cavity therein;

b) a separator lining said cavity and abutting said first electrode;

c) a second electrode comprising zinc powder and disposed within said separator lined cavity, said zinc powder having a tap density greater than 2.80 g/cc and less than 3.65 g/cc, a BET surface area greater than 400 cm^2/g, a KOH absorption value of at least 14%, and a D_{50} less than 130 microns; and

d) a quantity of alkaline electrolyte disposed within said container and in contact with said electrodes and said separator.

41. The electrochemical cell of claim 40 wherein said tap density is greater than 2.90 g/cc and less than 3.55 g/cc.

42. The electrochemical cell of claim 41 wherein said tap density is greater than 3.0 g/cc and less than 3.45 g/cc.

43. The electrochemical cell of claim 40, wherein said BET specific surface area is greater than 450 cm^2/g.

44. The electrochemical cell of claim 40, wherein said KOH absorption value is at least 15%.

45. The electrochemical cell of claim 40 wherein said D_{50} is between 100 and 130 microns.

46. The electrochemical cell of claim 45, wherein said D_{50} is between 110 and 120 microns.

47. The electrochemical cell of claim 40 wherein said zinc powder is a zinc alloy comprising bismuth between 75 ppm and 125 ppm, indium between 175 ppm and 225 ppm, and aluminum between 75 ppm and 125 ppm.

48. The electrochemical cell of claim 24, wherein the volume of zinc occupies less than 24.0% of the second electrode's volume.

49. The electrochemical cell of claim 30, wherein the volume of zinc occupies less than 24.0% of the second electrode's volume.

50. The electrochemical cell of claim 35, wherein the volume of zinc occupies less than 24.0% of the second electrode's volume.

51. The electrochemical cell of claim 40, wherein the volume of zinc occupies less than 24.0% of the second electrode's volume.

IX. Evidence Appendix (35 U.S.C. § 41.37(c))

None.

X. Related Proceedings Appendix (35 U.S.C. § 41.37(c))

None.